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Urinary Tract infection in patients of Diabetes Mellitus

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ABSTRACT
Objective:
This study was conducted to know the incidence of Urinary Tract Infection in the patients of diabetes mellitus.
Place and time of study:
This study was conducted in Outdoor patient department of THQ Hospital Pattoki, Pakistan lasting from January 2018 to June 2018.
Materials and Methods:
Every patient who had diabetes mellitus from last 3 years was included in our study. Patients were asked about asked about symptoms of UTI and fever on a preformed questionnaire. Urine samples were collected and then urine cultures were obtained. Informed Consent was obtained from every patient prior to inclusion in the study.
Results:
A total of 376 patients were included in our study. The mean age was 49.32 $\pm$ 2.2 with range from 36-60 years. 200 patients were male whereas 176 patients were female. 49(13.03%) patients had positive blood cultures. Out of 49 UTI patients , 30(61.22%) were asymptomatic whereas 19(26.54%) were having symptomatic UTI. Out of 49 UTI patients , 36(73.46%) were female whereas 13(26.54%) were males. The most common organism isolated was E.Coli, in 32(65.30%) patients whereas rest of the patient cultures showed other species.
Conclusions:
Asymptomatic bacteriruia is very common and every known patient of diabetes mellitus must be screened for UTI periodically.

Keywords:
UTI ; Diabetes Mellitus; Urine culture ; E.Coli

INTRODUCTION:

The urinary tract of humans is a continuous hollow organs system whose primary function is to continuously produce and eliminate urine in order to get rid of harmful waste products of body mainly urea[1]. The kidney forms the urine and it is transported to the bladder via two fibro-muscular tubes known as Ureters . In the bladder, urine is stored for some time until the initiation of micturation reflex. [2]

Urinary tract infection is the infection of the any part of urinary system from kidneys to the urethra. It is broadly divided in to two sub-classifications mainly Upper UTI and Lower UTI. Upper UTI is the infection of kidneys and ureter. Lower UTI is infection of Urinary bladder and urethra[3].

The risk factors of UTI include female anatomy, sexual intercourse, diabetes, obesity, family history, Benign prostatic hyperplasia, Indwelling catheters, Poor hygiene.

Diabetes mellitus is a heterogeneous group of disorders characterized by insulin resistance, decreased insulin production and increased glucose production. Patients of diabetes mellitus suffer from various infections but the most common is UTI[4][5][6].

UTI in diabetic patients occurs due to the lack of immunity, neutrophil dysfunction, autonomic neuropathy affecting bladder emptying and increased adherence to uroepthelial cells. The patients of diabetes produce less amount of cytokines in the urine. Cytokines are small proteins required to regulate host defences against bacterial infections[7]. Ecoli is the most common organism involved in UTI. Its adherence to uroepithelia cells is more in patients of diabtes mellitus than in normal individuals[8]. E.Coli which is normally considered a non invasive pathogen can invade the uroepithelial cells, replicate and form the intracellular reservoirs. These reservoirs serve as a source of recurrent UTI in patients of diabetes mellitus[9]. Lower levels of urinary cytokines coupled with the invasion of E.coli perfectly explains higher incidence of recurrent UTI in patients of diabetes mellitus.

The presentation of UTI in patients of diabetes mellitus include aymptomatic bacteriuria, Symptomatic bacteriuria. Asymptomatic bacteriuria is defined as presence of bacterias in the urine culture without the presence of symptoms in

the patient. Symptomatic UTI presents as dysuria, frequency, urgency, suprapubic pain and fever[10]. Urinary tract infection is diagnosed by the presence of White blood cells in urine and isolation of bacteria in the urine cultures. In case of any indwelling catheter, culture results of that catheter is obtained to diagnose the UTI. The treatment of UTI includes organism specific antibiotics, relieving any obstruction, increased intake of fluids and removal of foreign bodies if any[11].

MATERIALS AND METHODS:

Our study included patients of diabetes mellitus from last 3 years. A preformed questionnaire was given to patients to records signs and symptoms and relevant clinical history of patient. Informed consent obtained from the patients on written consent forms and Permission from hospital ethical committee was sought before starting study.

The case definition of diabetes mellitus was considered to be every patient having fasting glucose of 126 mg/dl or 2-h post prandial glucose of 200 mg/dl. The Urine samples of all the patients were collected in sterile urine jars and then immediately transferred to laboratory. Urine culture was performed of every patient having symptoms of UTI with or without elevated temperature, presence of more than 5 WBCs per hpf , raised leukocyte count of unknown etiology.

Any sample having more than 10^5 colony forming units per one ml of urine was defined as having significant bacteriuria.

The data which was collected in this study was analyzed using SPSS v20.0 and Microsoft excel 2007.

RESULTS:

- A total of 376 patients included in the study, out of which 49(13.03%) patients had significant bacteriuria or UTI whereas remaining patients did not have UTI(figure-

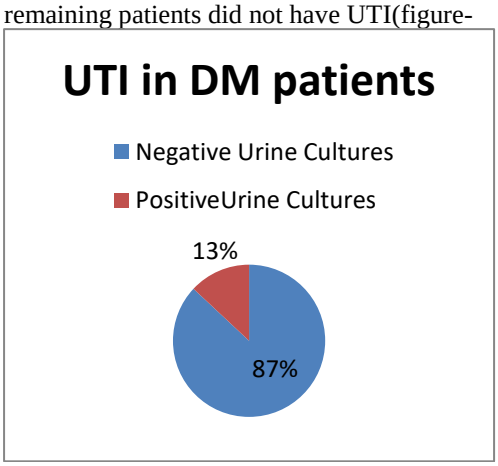

Figure-1

- The study showed that out of 49 patients of UTI, 30(61.22%) were not having symptoms of UTI whereas remaining 19(26.54%) were having symptoms of UTI. This gives us a high percentage of asymptomatic bacteriuria of around 61.22%(figure-2)

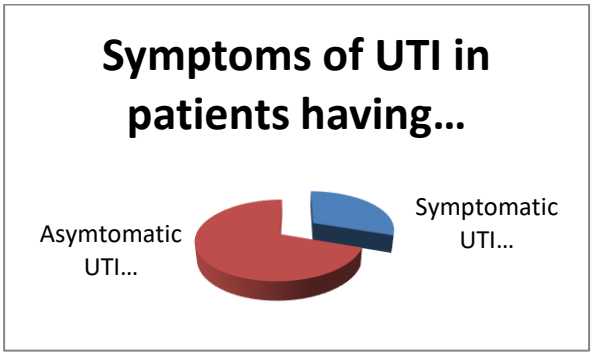

Figure-2

- The Distribution of UTI in patients of diabetes mellitus shows high incidence in female patients than in male as depicted in table-1

Positive Urine cultures	Frequency	Percentage
Male	13	26.53%
Female	36	73.46%
Total	49	100%

Table-1

- The data shows that incidence of asymptomatic bacteriuria is much higher in females than in males as shown in table-2

Positive Urine Cultures	Symptoms of UTI	
	Present(30)	Not Present(19)
Females(36)	26(72.22%)	10(27.77%)
Males (13)	4(30.77%)	9(69.23%)

Table-2

The urine cultures of patients of diabetes mellitus showed different organisms were grown the percentages of which are shown in the chart given below(figure-3)

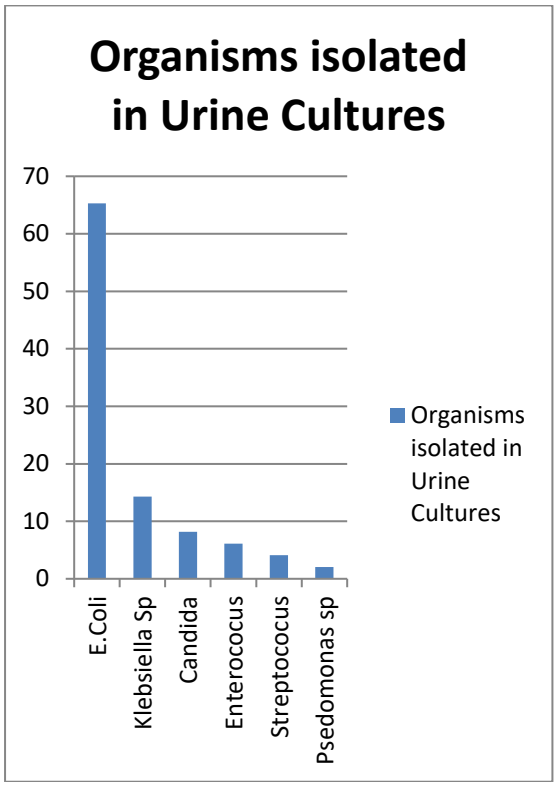

Figure-3

DISCUSSION:

Our study showed prevalence rate of UTI of 13% in patients of diabetes mellitus. This means Diabetes mellitus is a very well documented risk factor for UTI. This fact has been established by another study[12].

Asymptomatic bacteriuria means presence of bacteria in the urinary tract without obvious signs and symptoms of UTI. Our study showed that 70% patients did not have symptoms of UTI despite presence of bacteria in their tract.A study conducted by Marrie E A showed prevelance of 38% in diabetic patients which is much lower than the prevelance obtained in our study[13].

Our study showed prevelance of UTI in diabetics was higher in females than in males. Female sex is itself a risk factor for UTI apart from diabetes[14].

Various bacteria ca cause UTI in patients of diabetes mellitus. However our study showed that E.Coli was the most common organism responsible for this. E.Coli is an enteric pathogen also present in feces. Higher incidence of UTI in females as depicted by our study and anatomical location of urethra close to anus and shorter urethra in females perfectly explains this fact.E.Coli is a well known as most common pathogen causing UTI[15]. Klebsiella is also another common cause of UTI in females diabetics. Candida albicans is a fungus which is well known organism which causes UTI in immunocompromised hosts such as in diabetics[16].

CONCLUSIONS:

UTI is highly prevelant in patients of diabetes mellitus and especially asymptomatic bacteriuria is very common in diabetics. Routine Urine analysis should be performed in patients of diabetes to ascertain any underlying infection.

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